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FINAL REPORT
TO
OFFICE OF NAVAL RESEARCH

DOD High School Apprenticeship Program
Minority Student Summer 1988 Activities

Contract No. N00014-88-J-1159

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Director, Geophysical Fluid Dynamics Institute
The Florida State University
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Co-Manager: Dr. George Buzyna
Department of Mechanical Engineering
FAMU/FSU College of Engineering
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The Florida State University
Tallahassee, Florida

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1. INTRODUCTION

→ The summer of 1988 represents the seventh successful DOD Science and Engineering Summer Apprenticeship Program for High School Minority Students sponsored by the Office of Naval Research at Florida State University. The program this year was again administered by the Geophysical Fluid Dynamics Institute (GFDI) under the direction of Dr. Richard L. Pfeffer, and assisted by Dr. George Buzyna. Student activities were centered at GFDI and included work experience in GFDI and also in the Mesoscale Air-Sea Interaction Group (MASIG), under the direction of Dr. James J. O'Brien and the supervision of Mr. David Legler.

→ Eight students were selected to work in the summer program. The guidance counselors of five local high schools were approached to obtain the names of outstanding college bound minority students. This summer our student group consisted of five seniors, one juniors, and two exceptional sophomores. The departure from our past concentration on seniors was motivated by our desire to influence and expose students to possible scientific and engineering careers at an earlier age. Brief vitae of the selected students appear in the following section, and information pertaining to each apprentice is also attached at the end of the report.

Students were exposed to a broad range of work experiences, including experimental and observational data handling, processing data with the aid of computer operated equipment, conducting laboratory experiments and learning experimental techniques. The eight students were divided into teams of several students each and given slightly different assignments depending on their particular strengths, orientation and backgrounds. Students worked approximately 30 hours per week for 9-10 weeks. (StuW) ↗

In addition to assigned work experience in ONR research projects, the students also participated in enrichment activities including lectures, technical movies, laboratory demon-

strations, general discussions intended to broaden their experience in physical science, and a menu-driven computer based course in pre-calculus and calculus.

A summary of their activities and projects is included in section 3.

2. STUDENT VITAE

NAME: Darwin Ang

MINORITY: Asian male

HIGH SCHOOL: Florida High School

COLLEGE: Still in 11th grade at Florida High School

ANTICIPATED MAJOR: Medicine and Engineering

AWARDS/SCHOLARSHIPS: First Place, Regional Science Fair, 1985; Don Fuqua Congressman Award for Excellence in Science, 1985; Howard Wilson Piano Honors, 1985; First Place, School Science Fair, 1985; Science Student of the Month, 1986; United States Art Award, 1986; Most Responsible Award, 1986; Most Trustworthy Award, 1986; Most Likely to Succeed Award, 1986; Best All-Around Award, 1986; Most Talented Award, 1986; Honorable Mention, Regional Science Fair, 1986; Knowledge of Black History Award, 1987; Academic All-American Nomination, 1987; Third and Fourth Place, District Latin Forum, 1987; Third Place, State Latin Forum, 1987; Overall Winner, School Science Fair, 1988; First Place, Mathematics, Regional Science Fair, 1988; East Panhandle Award in Mathematics and State Science Fair, 1988; Marine Corps Award for Excellence in Science, 1988; National Council of Teachers of Mathematics Award, 1988; Army Award for Excellence in Science, 1988; Two First Places in District Latin Forum, 1988; Second Place, Latin Brain Bowl, 1988; Third Place, State Latin Forum, 1988; First Place, Doubles, Tennis Regionals, 1988.

ACTIVITIES/HOBBIES: Varsity Tennis Team, Sophomore Class President, Treasurer of School Civitan Chapter, National Honor Society, Brain Bowl Team, Latin Club, Inter-Club Council.



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NAME: Darrel Quantrill Chatmon

MINORITY: Black male

HIGH SCHOOL: Leon High School

COLLEGE: Unsure

ANTICIPATED MAJOR: Science

AWARDS/SCHOLARSHIPS: Most Outstanding Representative, 7th Grade; All "A" Honor Roll through Middle School; Attended Academic Resource Center, 1st through 8th Grade; High Honor Roll in High School.

ACTIVITIES/HOBBIES: Sergeant of patrols, Homeroom Representative, 6th and 7th grades; Student Body Treasurer, 8th grade; Beta Club; National Junior Honor Society; Pierian Club; National Honor Society; Latin Club; 9th and 10th Grade Class President; 11th and 12th Grade Student Body Treasurer; Student Government Association through middle and high school; Interact Club; Sergeant at Arms, Interact, 11th Grade; Soccer from age 10; Gayfers Teen Board Agent, 12th grade.

NAME: Cathy Doe

MINORITY: Black Female

HIGH SCHOOL: Godby High School

COLLEGE: University of Florida

ANTICIPATED MAJOR: Pre-Medicine

AWARDS/SCHOLARSHIPS: Partial scholarship to University of Florida. Member of National Honor Society. Member of National Spanish Honor Society.

ACTIVITIES/HOBBIES: Homecoming court, 9th, 10th, 11th and 12th grades. Cheer-leading and Karate.

NAME: Devika Koppikar

MINORITY: Asian Female

HIGH SCHOOL: Lincoln High School

COLLEGE: 12th grade in Lincoln High School

ANTICIPATED MAJOR: Journalism, Marketing or Social Sciences

ACTIVITIES/HOBBIES: Features page editor for school New paper, Trojan Talk. Member of Y-Club.

NAME: Sunita Nath

MINORITY: Asian Female

HIGH SCHOOL: Florida High School

COLLEGE: Stetson College, Florida

ANTICIPATED MAJOR: Medicine

AWARDS/SCHOLARSHIPS: Outstanding English Student, 1986. Most Improved Softball Player, 1986. Beverly Leigh Award, 1986. Outstanding Spanish Student, 1986. Second Place Winner, Spanish District Convention, 1986. Second Place Winner, Certamen, Latin District Convention, 1984. Hugh O'Brien Leadership Award, 1985. Senior Class notable - 'Wittiest', 1987. Y-Club President's Award, 1986. National Honor Society Member, Secretary and President, 1985-'87.

ACTIVITIES/HOBBIES: Class Representative, 10th Grade. Youth in Government, Senator, 1985. Spanish Club, Historian, 1987. Treasurer, Florida High Calendar Girls, 1987. Member, Inter-Club Council. Member, Soccerettes, Co-Captain, 1986, Captain, 1987. Cheerleading, 1984-'87, Co-Captain, 1987, Captain, 1988. Varsity Softball, 1986'87, Manager, 1987. Special Olympics Buddy, 1986. Body Shop Teen Board, 1987. Under 16 Girls Top of Florida Soccer, 1986. Homecoming court.

NAME: Gina Gabrielle Starr

MINORITY: Black Female

HIGH SCHOOL: Lincoln High School **COLLEGE:** 11th grade in Lincoln High School

ANTICIPATED MAJOR: Military Academy, Naval Technology or Intelligence

AWARDS/SCHOLARSHIPS: Hugh O'Brien Sophomore of the year, Lincoln high school. First and second place geometry team, 1987. Second Impromptu Speech State French Competition. First place Black History Brain Bowl team, 1987. Second Grammar, City French, third speech, city French. 10th State National French Exam, 1987.

ACTIVITIES/HOBBIES: Tennis, Service clubs, running, writing.

NAME: George D. Starr, Jr.

MINORITY: Black Male

HIGH SCHOOL: Lincoln High School

COLLEGE: Florida A & M University

ANTICIPATED MAJOR: Physical Science

AWARDS/SCHOLARSHIPS: National Achievement Scholar; Phi Eta Sigma Honor Society; Rattler Pride Award; Most Outstanding Student academic, 1988; President's Scholar; and National Dean's list.

ACTIVITIES/HOBBIES: Presidential Scholar's Association; Phi Eta Sigma; Couture Fashion Troupe; Alpha Men of Tomorrow; Math Club; Tennis, swimming, reading, music and fashion modeling.

NAME: Bhanu Subramani

MINORITY: Asian Female

HIGH SCHOOL: Lincoln High School

COLLEGE: University of Florida

ANTICIPATED MAJOR: Industrial Engineering/Minor in Business

AWARDS/SCHOLARSHIPS: 4-year Florida Academic Scholarship. Minority Scholarship from University of Florida.

ACTIVITIES/HOBBIES: Editor of Leon High School Newspaper, 1987-88; French Club; National Honor Society; Mu Alpha Theta (Math Honor Society).

3. WORK PROJECTS OF MINORITY STUDENTS

Each student participated in two different projects throughout the summer, selected among three different areas of work. The project common to all students was conducted at GFDI and consisted of digitizing velocity vector data from photographs of flow fields obtained in laboratory annulus experiments. This activity was part of a larger project on studies of the interaction of bottom topography with overlying baroclinic waves investigated by Drs. R. L. Pfeffer, R. Kung, and G. Buzyna. The students' work was supervised by Mr. Mark Raines and assisted by Messrs. Scott Humphries and Gerald Arnold. The two other projects included assisting in laboratory work conducted at GFDI under the supervision of Dr. George Buzyna and digitizing of contour fields of observed wind stress components over the tropical Pacific conducted at the Mesoscale Air-Sea Interaction Group under the supervision of David Legler.



Bhanu develops the film from the previous day's experimental run.

3.1 Studies of photographic velocity data from laboratory experiments on the interaction of topography with baroclinic waves, and flows with azimuthally varying lower thermal boundary conditions.

This was a major project in which all students participated. The majority of their time was spent in digitizing photographs which were recorded in laboratory experiments designed to study the interaction of topography with baroclinic waves and interaction with different thermal conditions at the lower boundary. The experiments were conducted in a rotating, differentially heated annulus of fluid.



Darrel develops prints to be used later for digitizing.

The data from the experiments were obtained by means of a camera, mounted at the top of the rotating annulus, which recorded the movements of laser-illuminated particles suspended in the fluid. The camera produced a sequence of still photographs, in each of which the movement of every particle appeared as a string of dots. By digitizing the

position of these dots and calculating the distance between dots and the orientation of each string of dots, one can determine the velocity field as a function of time. Fourier analyses and energetics calculations of such data provide valuable information about the behavior of baroclinic fluids in the presence of bottom topography.

The students had the opportunity to gain experience in the use of digitizing equipment, personal computers, and video monitors which display the work graphically as it is being digitized. They were also able to see and discuss the results of a first-level analysis of the digitized data produced with the CDC Cyber 760 mainframe computer. During the course of the summer, the students worked with photographs from several different experiments, which allowed them to see effects of variations in experimental parameters such as the difference in temperature between the inner and outer walls of the bath, the speed of rotation, and the presence or absence of topography.

Efforts were made to ensure the students' understanding of the relationships between the theoretical model and observable phenomena, such as the jet stream and ocean currents, which effect the transfer of energy between the earth's equator and poles.

3.2 Laboratory work

Students assisted in the preparation and conducting of annulus experiments and also conducted some experiments of qualitative and educational nature pertaining to geophysical flows. An annulus experiment was assembled which could be conducted by the students themselves and yet obtain some valuable preliminary results. The experiment consisted of a conventional rotating, differentially heated, annulus apparatus modified such that the bottom boundary was composed of four quadrants with different thermal properties, alternating between acrylic plastic (a poor thermal conductor) and aluminum (a good thermal conductor) sectors. Students performed control experiments with the customary uniform acrylic plastic bottom and then compared results with the experiment conducted with al-

ternating thermal properties and shapes of the bottom boundary. The students were able to conduct these experiments on their own and experience the excitement of finding new results observed for the first time.



Gina locates the center of the circle before beginning digitizing.

Before the various experiments could be performed, the students had to assist in the preparation and assembly of the apparatus. In this way they experienced first hand the requirements of conducting an experiment, the various aspects of the apparatus, procedures and techniques. Flow patterns were viewed by means of a video camera and monitor, and recorded on a time lapse video recorder for later viewing, study, and sharing with other students.

When the students were not engaged in rotating and thermally convecting experiments, they were given another experimental project, namely that of measuring viscosities of fluids to be used in the experiments. Students learned how to use a falling ball viscometer and the Cannon-Fenske Routine viscometer to measure viscosities of several fluids at

several different temperatures. Some of the students also participated in the printing of photographs in the darkroom. These photographs were later used in digitizing work.

3.3 Digitizing of contour fields of wind stress components over the tropical Pacific

This project was part of a larger upper ocean forecasting research project conducted by the Mesoscale Air-Sea Interaction Group directed by Dr. J. J. O'Brien. A team of students spent part of their time on this project under the tutelage of David Legler.



Sunita digitizes a contour map of wind stress components over the tropical Pacific.

Students were responsible for digitizing contour fields of wind stress components which were hand analyzed by a synoptician. A Tektronix digitizer was used as the interface to the mainframe, CDC Cyber 760. The students learned chart interpretation and also basic techniques in scalar analysis. The students were then responsible for correcting any errors using both interactive and batch jobs. This involved making minor modifications to FORTRAN code and graphics programs.

As the analyses became finalized, the variability of the wind field over the tropical Pacific was explained and discussed with students. They were also introduced to the complexity of the Pacific trade wind system and how the analyses would help in studying such events as El Niño and the Southern Oscillation.

4. INSTRUCTION AND ENRICHMENT ACTIVITIES

The instructions and training received by the students concerning their work assignments always went beyond that needed to do the job. An attempt was always made to make their work experience a learning process and an introduction to scientific research. An explanation of the research project, its implications, and the contribution of the student's work to the overall project was always given.

Aside from the students' regular work, a variety of activities were scheduled. Activities included a series of lectures on research topics pertaining to their work and the work of the research staff. Lectures were given by Drs. Buzyna, Loper, Pfeffer, O'Brien, Mr. Legler, and Mr. Raines, as well as members of the Meteorology Department in conjunction with an NSF minority program for college students. A series of educational scientific movies were also shown, such as properties of rotating flows, annulus convection, atmospheric radiation, atmospheric flows as seen by satellite, surface tension, and others. The students were also given opportunities to experience work in areas outside their main assignments, so that all students could experience each other's work and thus broaden their overall experience.

A new enrichment program started last summer which included an interactive computer course in pre-calculus and a first course in calculus, was continued this summer. Students were able to progress at their own pace and evaluate their work with tests; they were not allowed to advance to the next subject without a mastery of the preceding topic. They worked on this program during certain designated times during their work schedule, and also on their own free time. The intent was to strengthen their mathematical foundations, give them a head start for their next math courses, and have fun at the same time.



Darwin (foreground) examines an experiment he will later demonstrate to his fellow program participants.

5. CONCLUSION

The summer program was very successful this year. The students were bright, attentive, well-motivated, and willing to work. Aside from the monetary reward, the students related that they benefited a great deal from their summer experience, especially the younger students. They were grateful for the opportunity to work in a scientific environment and

acquire new skills and experience. Their contribution to the various projects was also significant. The digitizing work was done carefully and accurately and hence contributed substantially to a much needed data base for further analysis and study. Their work on other projects enabled us to investigate certain aspects we might not have otherwise found time to do or would have to do at some later time.

In general, the students felt financially rewarded and scientifically enriched by their experience in the summer program. We feel that the students acquired a certain maturity and confidence which should be a great asset to them during their final years in high school, college, and their chose careers. As in the past, our program has drawn attention from the media and several of our students were interviewed on television news programs where they related some of their experiences.



Cathy gets a start on her anticipated college math course on the interactive PLATO terminal.

INFORMATION FOR EACH MENTOR

1 NAME Pfeffer Richard
 Last First

2 INSTALLATION Florida State University, Geophysical Fluid Dynamics Institute
 name

(904) 644-5594

3 DATE OF BIRTH November 26, 1930

4 SEX FEMALE MALE

5 RACE/ETHNICITY: (Voluntary) Black White Hispanic Asian Other

6 HIGHEST DEGREE EARNED Ph.D.

7 PRINCIPAL FIELD OF RESEARCH Meteorology

8 NUMBER OF YEARS OF MENTORSHIP 6

9 NUMBER OF APPRENTICES SUPERVISED THIS YEAR, 1988 3

INFORMATION FOR EACH MENTOR

(Suggested Form)

1 NAME Buzyna George
last first

2 INSTALLATION Florida State University, Geophysical Fluid Dynamics Institute
name

3 DATE OF BIRTH April 25, 1938

4 SEX FEMALE MALE

5 RACE/ETHNICITY: (Voluntary) Black White Hispanic Asian Other

6 HIGHEST DEGREE EARNED Ph.D.

7 PRINCIPAL FIELD OF RESEARCH Geophysical Fluid Dynamics

8 NUMBER OF YEARS OF MENTORSHIP 4

9 NUMBER OF APPRENTICES SUPERVISED THIS YEAR, 1988 8

INFORMATION FOR EACH MENTOR

1 NAME Kung Robin
Just Jill

2 INSTALLATION Florida State University, Geophysical Fluid Dynamics Institute
name

3 (904) 644-6597
phone

4 SEX FEMALE MALE

5 RACE/ETHNICITY:(Voluntary) Black White Hispanic Asian Other

6 HIGHEST DEGREE EARNED Ph.D.

7 PRINCIPAL FIELD OF RESEARCH Geophysical Fluid Dynamics

8 NUMBER OF YEARS OF MENTORSHIP 4

9 NUMBER OF APPRENTICES SUPERVISED THIS YEAR, 1988 3

INFORMATION FOR EACH MENTOR

(Suggested Form)

1 NAME Legler David
 Last First

2 INSTALLATION Florida State University, Geophysical Fluid Dynamics Institute
 name

(904) 644-4581
 phone

3 DATE OF BIRTH April 14, 1960

4 SEX FEMALE MALE

5 RACE/ETHNICITY: (Voluntary) Black White Hispanic Asian Other

6 HIGHEST DEGREE EARNED M.S.

7 PRINCIPAL FIELD OF RESEARCH Meteorology

8 NUMBER OF YEARS OF MENTORSHIP 6

9 NUMBER OF APPRENTICES SUPERVISED THIS YEAR, 1988 2

INFORMATION FOR EACH MENTOR

1 NAME Raines Mark
11111

2 INSTALLATION Florida State University, Geophysical Fluid Dynamics Institute
name
(904) 644-6085
phone

3 DATE OF BIRTH September 18, 1960

4 SEX FEMALE MALE

5 RACE/ETHNICITY: (Voluntary) Black White Hispanic Asian Other

6 HIGHEST DEGREE EARNED Undergraduate Student, Laboratory Technician, Supervisor

7 PRINCIPAL FIELD OF RESEARCH Geophysical Fluid Dynamics

8 NUMBER OF YEARS OF MENTORSHIP 3

9 NUMBER OF APPRENTICES SUPERVISED THIS YEAR, 1988 8

INFORMATION FOR EACH MENTOR

(Suggested Form)

1 NAME: Arnold Gerald
Last First

2 INSTALLATION Florida State University, Geophysical Fluid Dynamics Institute
name

3 DATE OF BIRTH March 2, 1967

4 SEX FEMALE MALE

5 RACE/ETHNICITY: (Voluntary) Black White Hispanic Asian Other

6 HIGHEST DEGREE EARNED B.A., Graduate Student, Darkroom Technician

7 PRINCIPAL FIELD OF RESEARCH Geophysical Fluid Dynamics

8 NUMBER OF YEARS OF MENTORSHIP 3

9 NUMBER OF APPRENTICES SUPERVISED THIS YEAR, 1988 3

INFORMATION FOR EACH MENTOR

(Suggested Form)

1 NAME: Humphries Scott
Last First

2 INSTALLATION Florida State University, Geophysical Fluid Dynamics Institute
name

(904) 644-6085
phone

3 DATE OF BIRTH 11/13/61

4 SEX FEMALE MALE

5 RACE/ETHNICITY: (Voluntary) Black White Hispanic Asian Other

6 HIGHEST DEGREE EARNED B.A., Research Assistant

7 PRINCIPAL FIELD OF RESEARCH Geophysical Fluid Dynamics

8 NUMBER OF YEARS OF MENTORSHIP 5

9 NUMBER OF APPRENTICES SUPERVISED THIS YEAR, 1988 8

(Suggested Form)

INFORMATION FOR EACH APPRENTICE

1	NAME <u>Ahg</u> last	Darwin first
2	ADDRESS <u>2100 Orleans Dr.</u> (permanent)	<u>004</u> street & number phone
	<u>Tallahassee,</u> city	<u>Florida</u> state <u>32308</u> zip code
2a	(school address, '87-'88, if applicable)	<u>Florida High School</u> <u>004</u> <u>644-</u> phone
3	LAST GRADE COMPLETED <u>10</u>	TYPE OF SCHOOL: <input checked="" type="checkbox"/> Public <input type="checkbox"/> Private
4	SEX <input checked="" type="checkbox"/> Male <input type="checkbox"/> Female	
5	RACE/ETHNICITY: (Voluntary) <input type="checkbox"/> Black <input type="checkbox"/> White <input type="checkbox"/> Hispanic <input checked="" type="checkbox"/> Asian <input type="checkbox"/> Other	
6	INSTALLATION <u>Geophysical Fluid Dynamic Institute, Florida State University</u> name	
7	MENTOR <u>Dr. George Buzyna</u> name	Associate Professor title
8	PRINCIPAL DISCIPLINE OF RESEARCH <u>Atmospheric Science</u>	
9	MAJOR TASKS PERFORMED <u>Digitizing velocity vector data from photographs of flow</u> <u>fields obtained in laboratory experiments. Prepared and conducted laboratory and</u> <u>demonstration experiments.</u>	
10	HONORS <u>Don Fuqua Congressman Award for Excellence in Science, 1985; Best All Around, 1986;</u> <u>Knowledge of Black History Award, 1987; First Place, Mathematics, Regional Science</u> <u>Fair, 1988; East Panhanale Award in Mathematics and Science Fair, 1988; Marine Corps Award for</u> <u>Excellence in Science, 1988; National Council of Teachers of Mathematics Award, 1988; Army Award</u> <u>for Excellence in Science, 1988; Two First Places in District Latin Forum, 1988; Second place,</u> <u>Latin Brain Bowl, 1988; Third place, State Latin Forum, 1988.</u>	

(Suggested Form)

INFORMATION FOR EACH APPRENTICE

1 NAME Chatmon Darrel
 last first

2 ADDRESS 3728 Sutton Court ()
 (permanent) street & number phone
Tallahassee, Florida 32312
 city state zip code

2a (school address, '87-'88, if applicable) ()
 phone

3 LAST GRADE COMPLETED 12 TYPE OF SCHOOL: (X)Public ()Private

4 SEX (X)Male ()Female

5 RACE/ETHNICITY: (Voluntary) (X)Black ()White ()Hispanic ()Asian () Other

6 INSTALLATION Geophysical Fluid Dynamics Institute, Florida State University
 name
 Mr. Gerald Arnold Darkroom Technician
 MENTOR Dr. George Buzyna Assoc. Prof.
 name title

7 PRINCIPAL DISCIPLINE OF RESEARCH Atmospheric Sciences

8 MAJOR TASKS PERFORMED Digitizing velocity vector data from photographs of flow
 fields obtained in laboratory experiments. Assisted in darkroom, developed film
 and printed photographs.

9 HONORS Most Outstanding Representative, 7th grade; All "A" Honor Roll through Midd
 School, High Honor Roll in High School.

(Suggested Form)

INFORMATION FOR EACH APPRENTICE

1 NAME Doe Cathy
last first

2 ADDRESS 1105 Mission Wood Lane () phone
(permanent) street & number

Tallahassee Florida 32304
city state zip code

2a (school address, '87-'88, if applicable) () phone

3 LAST GRADE COMPLETED 12 TYPE OF SCHOOL: Public Private

4 SEX Male Female

5 RACE/ETHNICITY: (Voluntary) Black White Hispanic Asian Other

6 INSTALLATION Geophysical Fluid Dynamics Institute, Florida State University

7 MENTOR Mr. David Legler Meteorologist
Dr. George Buzyna Assoc. Prof.
name title

8 PRINCIPAL DISCIPLINE OF RESEARCH Atmospheric Science

9 MAJOR TASKS PERFORMED Digitizing of contour fields of wind stress components
over the tropical pacific. Digitizing velocity vector data from photographs of flow
fields obtained in laboratory experiments.

10 HONORS Partial Scholarship to University of Florida; Member of National Honor
Society; Member of National Spanish Honor Society

(Suggested Form)

INFORMATION FOR EACH APPRENTICE

1 NAME Koppikar Devika
last first

2 ADDRESS 2363 Tour Eiffel Drive (904)
(permanent) street & number phone
Tallahassee, Florida 32308
city state zip code

2a (school address, '87-'88, if applicable) Lincoln High School ()
phone

3 LAST GRADE COMPLETED 11 TYPE OF SCHOOL: Public Private

4 SEX Male Female

5 RACE/ETHNICITY: (Voluntary) Black White Hispanic Asian Other

6 INSTALLATION Geophysical Fluid Dynamics Institute, Florida State University
name

7 MENTOR Dr. George Buzyna, Assoc. Prof.
name title

8 PRINCIPAL DISCIPLINE OF RESEARCH Atmospheric Science

9 MAJOR TASKS PERFORMED Digitizing velocity vector data from photographs of flow
fields obtained in laboratory experiments.

10 HONORS Member of Y-Club, Features page editor of school newspaper

(Suggested Form)

INFORMATION FOR EACH APPRENTICE

1 NAME Nath Sunita
last first

2 ADDRESS 431 Victory Garden Dr. (904) 877-1644
(permanent) street & number phone

Tallahassee, Florida 32301
city state zip code

2a (school address, '87-'88, if applicable) () phone

3 LAST GRADE COMPLETED 12 TYPE OF SCHOOL: Public Private

4 SEX Male Female

5 RACE/ETHNICITY: (Voluntary) Black White Hispanic Asian Other

6 INSTALLATION Geophysical Fluid Dynamics Institute, Florida State University
name

7 MENTOR Mr. David Legler and Dr. George Buzyna Associate Prof.
name title

8 PRINCIPAL DISCIPLINE OF RESEARCH Atmospheric Science

9 MAJOR TASKS PERFORMED Digitizing of contour fields of wind stress components over
the tropical pacific. Digitizing velocity vector data from photographs of flow
fields obtained in laboratory experiments.

10 HONORS Outstanding English Student, 1986; Beverly Leigh Award, 1986; Outstanding Spanish
Student, 1986; Second place winner, Spanish District Convention, 1986; Second place winner
Certamen, Latin District Convention, 1984; Hugh O'Brien Leadership Award, 1985; Y-Club
President's Award, 1986; National Honor Society Member, Secretary and President, 1985-'87

(Suggested Form)

INFORMATION FOR EACH APPRENTICE

1	NAME	Starr	George
	last	first	
2	ADDRESS	1508 Davis Dr.	(904) 878-1292
	(permanent)	street & number	phone
	Tallahassee,	Florida	32301
	city	state	zip code
2a	(school address, '87-'88, if applicable)	()	phone
3	LAST GRADE COMPLETED	12	TYPE OF SCHOOL: <input checked="" type="checkbox"/> Public <input type="checkbox"/> Private
4	SEX	<input checked="" type="checkbox"/> Male <input type="checkbox"/> Female	
5	RACE/ETHNICITY: (Voluntary)	<input checked="" type="checkbox"/> Black <input type="checkbox"/> White <input type="checkbox"/> Hispanic <input type="checkbox"/> Asian <input type="checkbox"/> Other	
6	INSTALLATION	Geophysical Fluid Dynamics Institute, Florida State University	
	name		
7	MENTOR	Dr. George Buzyna,	Associate Professor
	name		title
8	PRINCIPAL DISCIPLINE OF RESEARCH	Atmospheric Science	
9	MAJOR TASKS PERFORMED	Digitizing velocity vector data from photographs of flow fields obtained in laboratory experiments.	
10	HONORS	National Achievement Scholar; Phi Eta Sigma Honor Society; Rattler Pride Award; Most Outstanding Student Academic, 1988; President's Scholar; and National Dean's List. Presidential Scholar's Association; Phi Eta Sigma; Couture Fashion Troupe; Alpha Men of Tomorrow; and Math Club.	

(Suggested Form)

INFORMATION FOR EACH APPRENTICE

1	NAME	Starr	Gina
	last	first	
2	ADDRESS	1508 Davis Dr. (permanent)	(904) 878-1292 street & number phone
	city	Tallahassee, Florida	32301 state zip code
2a	(school address, '87-'88, if applicable)	Lincoln High School	(phone
3	LAST GRADE COMPLETED	10	TYPE OF SCHOOL: <input checked="" type="checkbox"/> Public <input type="checkbox"/> Private
4	SEX	(Male <input checked="" type="checkbox"/> Female	
5	RACE/ETHNICITY:(Voluntary)	<input checked="" type="checkbox"/> Black <input type="checkbox"/> White <input type="checkbox"/> Hispanic <input type="checkbox"/> Asian <input type="checkbox"/> Other	
6	INSTALLATION	Geophysical Fluid Dynamics Institute, Florida State University	
	name	Dr. Richard L. Pfeffer, Professor	
7	MENTOR	Dr. George Buzyna	Associate Professor
	name	title	
8	PRINCIPAL DISCIPLINE OF RESEARCH	Atmospheric Science	
9	MAJOR TASKS PERFORMED	Digitizing velocity vector data from photographs of flow fields obtained in laboratory experiments. Assist in computations.	
10	HONORS	Hugh O'Brien Sophomore of the Year, 1988; First and Second place, Geometry Team, 1987; Second Impromptu Speech, State French Competition; First place Black History Brain Bowl Team, 1987; Second Grammer, City French, Third Speech, City French.	

(Suggested Form)

INFORMATION FOR EACH APPRENTICE

1 NAME Subramani Bhanu
last first

2 ADDRESS (permanent) street & number () phone
Tallahassee, Florida 323

city state zip code

2a (school address, '87-'88, if applicable) () phone

3 LAST GRADE COMPLETED 12 TYPE OF SCHOOL: Public Private

4 SEX Male Female

5 RACE/ETHNICITY: (Voluntary) Black White Hispanic Asian Other

6 INSTALLATION Geophysical Fluid Dynamics Institute, Florida State University
name

7 MENTOR Mr. Gerald Arnold, Darkroom Technician Associate Professor
name title

8 PRINCIPAL DISCIPLINE OF RESEARCH Atmospheric Science

9 MAJOR TASKS PERFORMED Assist in darkroom, development of film and printing photographs.
Digitizing velocity vector data from photographs of flow fields obtained in laboratory
experiments.

10 HONORS 4-year Florida Academic Scholarship; University of Florida Minority Scholarship;
Member of National Honor Society; Member of Math Honor Society (Mu Alpha Theta)